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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/663,582	09/18/2000	Udo Gruber	SGL 99/5 US	4122

7590 03/19/2002

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EXAMINER

THOMPSON, CAMIE S

ART UNIT	PAPER NUMBER
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1774

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DATE MAILED: 03/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Application No.	Applicant(s)
09/663,582	GRUBER ET AL.
Camie S Thompson	1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) 23-66 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-22, drawn to a composite material, classified in class 428, subclass 293.4.
 - II. Claims 23-66, drawn to method of manufacturing, classified in class 501, subclass 128.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, pressing and curing can be used to make a fiber reinforced ceramic composite.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Loren D. Pearson on 2/28/02 a provisional election was made with traverse to prosecute the invention of I, claims 1-22. Applicant in replying to this Office action must make affirmation of this election. Claims 23-66 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

6. Claim 8 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8. Claims 1-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The language in claim 1 is confusing and does not distinctly point out what the fractions of fiber bundles are separated by. The phrase "separated by a minimum in a total fiber bundle

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distribution of the weights of the fiber bundles being a function of fiber bundle length" is not clear. The claim does not definitely point out what the intent of the claim is.

9. Claims 2-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "at least partly" in claims 2 and 4 is a relative term, which renders the claim indefinite. The term "at least partly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claim 2 does not distinctly point out that the fiber bundles have a protection layer. Claim 4 does not distinctly point out that the fiber bundles contain nano fibers, whiskers or nanotubes in place of the fibers.

The term "highly" in claim 3 is a relative term, which renders the claim indefinite. The term "highly" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Claim 3 does not distinctly point out fibers that are resistant to elevated temperatures.

10. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3 refers to "carbonized types of cellulose fibers" and "other organic fibers".

The applicant has not pointed out what fibers are being referred to. Also, the term "type" in "carbonized type" is also indefinite. One of ordinary skill in the art would not be reasonably apprised as to what "type" refers to. The examiner suggests inserting "carbonized cellulose fibers" in place of the instant language.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-3, 5, and 7-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tredway et al., U.S. Patent No. 5,552,213.

The Tredway reference discloses a glass ceramic and a plurality of primary and secondary reinforcing fibers dispersed in the matrix. The reference also discloses that the secondary reinforcing fibers are shorter than the primary fibers and that the secondary fibers fill the region of the matrix as per instant claims 1, 9 and 10. See the abstract. Tredway et al. also discloses boron nitride particles dispersed in the matrix as a protective layer as per instant claim 2 to improve oxidative stability and lubricity of the composite (see column 4, lines 9-10). The reference also discloses that the reinforcing fibers can consist of carbon and silicon carbide as per instant claim 3 (see column 4, lines 21-22). The reference also discloses that the ceramic

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matrix contains suitable glass-ceramic materials consisting of aluminum silicate combinations as per instant claim 5 (see column 2, lines 59-69). Tredway et al. discloses that the fiber bundles are carbon and graphite as per instant claim 7 and that the ceramic matrix contains silicon carbide as a phase or carbon as a phase as per instant claim 8 (see column 3, lines 21-23). The discontinuous primary reinforcing fibers are 6 mm to 25 mm and that the secondary reinforcing fibers are shorter at 0.5 mm to 2 mm as per instant claims 11 and 12 (see column 3, lines 55-69 and column 4, lines 1-6). Therefore, Tredway meets the claim limitations under 35 U.S.C. 102.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 4,6 and 13-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tredway et al., U.S. Patent No. 5,552,213 in view of Beier et al., U.S. Patent 6,316,086.

The Tredway reference discloses a glass-ceramic matrix composite with a plurality of primary and secondary reinforcing fibers where the secondary fibers fill the regions of the matrix and are shorter than the primary fibers. The Tredway reference does not disclose using whiskers as per

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instant claim 4. However, the Beier reference teaches that glass ceramic matrices can be reinforced with whiskers (see column 6, line 5). Therefore, it would be obvious to one of ordinary skill in the art to use whiskers in ceramic composites because the composites are easier to produce and easier to shape when whiskers are included (see column 6, lines 27-29).

The Tredway reference does not disclose using additions as per instant claim 6. The Beier reference discloses using additions consisting of iron, chromium, aluminum, molybdenum, and titanium in glass ceramic matrices. It would be obvious to one of ordinary skill in the art to add inorganic fillers in the ceramic matrix being motivated by the improved friction and comfort while decreasing the hardness of the composite (see column 5, lines 1-31).

Tredway et al. does not disclose the width, fiber bundle fraction, length/width/height ratio, weight ratio or the fiber bundle length distribution. However, the Beier reference discloses that the typical thickness for a ceramic matrix that is used in a friction lining is 1 mm to 30 mm.

Therefore, it would be obvious of one of ordinary skill in the art to have the average reinforcing fiber bundle width to be 0.02 mm to 5 mm; the average matrix fiber bundle width to be 0.02 mm to 2mm; the ratio of the reinforcing fiber bundle length to the matrix fiber bundle length to be 1.5 to 10; the ratio of the reinforcing fiber bundle width to the matrix fiber bundle width to be 2 to 500; the weight fraction ratio of the matrix fiber bundles to be between 0.1 and 0.8; and the reinforcing fiber bundle and matrix bundle width at half maximum of fiber bundle length distribution to be 0.01 mm to 15 mm and 0.01 mm to 5 mm respectively. The resulting length/width/height ratio of the reinforcing fiber bundle and the matrix fiber bundle would be expected to be within the range of 2 and 50,000 based on the dimensions of the fiber bundles.

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Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (703) 305-4488. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly, can be reached at (703) 308-0449. The fax phone numbers for the Group are (703) 872-9310 {before finals} and (703) 872-9311 {after finals}.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Cst
March 12, 2002

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

